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Decomposition analysis of rice in agro: Climatic zone of Chhattisgarh

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Abstract

The present study has been undertaken to different agro climatic zone of Chhattisgarh, where rice is the competing crop to other kharif crops. The entire Chhattisgarh state is studied, considering its three agro climatic zones which include 28 districts of Chhattisgarh as units of investigation. Secondary data collected from different sources were used for the research work, for the period 2002-03 to 2017-18. For the estimation of the contribution of area and yield with change in production, the decomposition model has been used. The result of the decomposition analysis showed that there was positive effect of area and interaction of area and yield except northern hill zone. So that it can be concluded that to significant increase in the cultivation of rice in the production was due to favorable climate in cultivation of rice in the study area.

Keywords: decomposition, rice, agro-climatic zone, Chhattisgarh

1. Introduction

Agricultural production includes two components. They are food grains and non-food grains. All food grains like Paddy, Wheat, Maize, Bajra, Jowar, Ragi, Bengal gram are the main food grain crops in India. All commercial crops are under the category of non-food grains. Paddy crop is the one of the main food grain crop. The production of food grains constitute the most significant role in agricultural production of any country which is being recognized as having an urgent need to raise production in view of the large gap between demand and supply of food grains. As a matter of fact, sustained and accelerated development of Indian agriculture is the key to acceleration in economic development and eradication of poverty by supplying food grains to all the sections of the country including the poor. Moreover, a large number of industries like rice, textiles, silk, sugar, flourmills and milk products get raw material from agriculture. It has strongly forward and backward linkages within the rural sector and with the strategy of overall economic growth and development. However, the paddy crop is being neglected in India in recent years by the both of the Government policies and individual interests of the formers; it is highly needful to analyze the trends in paddy crop and taking the necessary steps to improve the paddy productivity and production in India.

In developing country like India, agriculture even at the present times overwhelmingly important as it provides livelihood for the more than half of total work force and supplies food to the whole nation. Hence, agriculture growth performance has become a serious issue of concern for both academicians and policy makers as it is subject to various fluctuations. Since independence its sources of growth have been changing. For effective policy measures one need to understand what contributes to the agricultural growth. Many scholars have attempted to understand the key sources of agricultural growth through decomposition analysis.

Growth decomposition in agriculture output has remained very important issue for researchers and policy makers. To facilitate output project with alternative targets and policies, the breakdown of growth into various components such as area, yield and cropping pattern is important. The trend of agricultural production in the past and the estimation of its growth rates can provide a basis for future projections of agricultural output. Therefore, the present study makes an attempt to analyze the contribution of area and yield to overall output growth.

2. Materials and Methods

The present study was carried out in the state of Chhattisgarh. The state comprises of three agro climatic zone, which are Chhattisgarh Plains, Bastar Plateau and Northern Hills, which includes 28 districts of Chhattisgarh.

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A marked variation prevails in soil and climate which divided the state in three distinct agro climatic zones, which have resulted in great variation in farming patterns in area, production and productivity in different parts of the state. All the zone and Chhattisgarh state was selected purposively for the study due to some special purpose as to know the decomposition analysis of rice crop. The data were collected for the last 15 years that is from the year 2002-03 to 2017-18 for all the districts within zone and the data was entirely based on secondary source from different published sources like Government of Chhattisgarh, Department of Agricultural Statistics, Directorate of Economics & Statistics, Chhattisgarh, Directorate of Agriculture and Statistical Abstracts of Chhattisgarh State etc.

2.1 Analysis of data

In order to fulfill the objectives of the study, the collected data were analyzed by using appropriate techniques and tools like decomposition model.

2.2 Method of analysis

2.2.1 Estimation of decomposition of total agricultural output growth

For estimation of contribution of area and yield towards change in production (positive/negative) were estimated using the following model as suggested by Minhas, 1964.

2.2.2 Area Effect: Shows percentage share of area in total production

$$AE = \frac{(A_n - A_0)Y_0}{P_n - P_0} \times 100$$

2.2.3 Yield Effect: Shows percentage share of average yield in total production

$$YE = \frac{(Y_n - Y_0)A_0}{P_n - P_0} \times 100$$

2.2.4 Interaction Effect: Shows percentage share of area and yield (simultaneous variation) interaction towards total production.

$$IE = \frac{(A_n - A_0)(Y_n - Y_0)}{P_n - P_0} \times 100$$

Where,

A_0 = Triennium average of area in base year

P_0 = Triennium average of production in base year

A_n = Triennium average of area in current year

P_n = Triennium average of production in current year

$Y_n = P_n / A_n$

$Y_0 = P_0 / A_0$

3. Results and Discussion

3.1 Decomposition analysis

The contribution of area and productivity or the interaction of area and yield of the production by agro-climatic zones and Chhattisgarh state as a whole was estimate by using the decomposition profounded by Dr. Minhas 1964, which is presented in Table.

3.2 Change in production of rice in agro-climatic zone of Chhattisgarh

The output of rice was affected significantly higher by yield

in Northern hill zone of Chhattisgarh which was found to be 107.81 per cent while effect of area and interaction of area and yield was found negative effect in output of rice. In case of Bastar plateau zone of Chhattisgarh the output of rice was affected significantly by yield which was found to be 85.59 per cent while effect of area and interaction of area and yield was found to be positive effect and in the Chhattisgarh plain zone of Chhattisgarh, the output of rice was affected significantly by yield which was found to be 82.02 per cent while effect of area and interaction of area and yield which was found to be positive effect in output of rice. In Chhattisgarh state the output of rice was affected significantly by yield which was found to be 87.20 per cent while effect of area and interaction of area and yield was found positive effect in output of rice.

Table 1: Change in production of rice for agro-climatic zone of Chhattisgarh (in per cent)

Particulars	AE	YE	IE
Chhattisgarh Plains	16.07	82.02	1.92
Northern Hills	-7.29	107.81	-0.52
Bastar Plateau	12.71	85.59	1.72
Chhattisgarh	8.70	87.20	4.10

*AE= Area effect, YE= Yield effect, IE= Interaction effect

Thus it can be inferred from the result that there was positive effect of area and interaction of area and yield except northern hill zone. So that it can be concluded that to significant increase in the cultivation of rice in the production was due to favorable climate in cultivation of rice in the study area.

4. Suggestions

The results of decomposition analysis for examining the contribution of area towards increase in the production of rice was found to be higher than productivity as compare to yield in agro climatic zone and Chhattisgarh as a whole and the growth in production of rice crop is due to increase in acreage while in the yield effect was observed to be dominated in production. The domination of yield and interaction effect over area effect for rice crop of zone and state as a whole leads to recommend that future strategy for increasing production of agricultural output should be for enhancing productivity rather than enhancing area under cultivation of crop.

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